

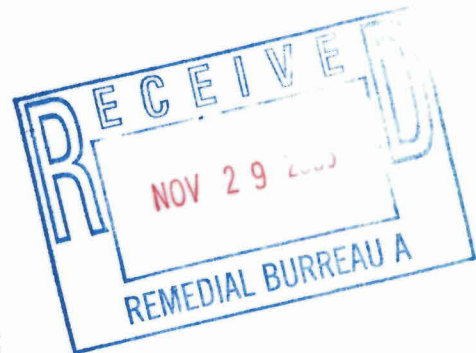
SITE INVESTIGATION REPORT

FORMER CENTRAL ISLIP PSYCHIATRIC CENTER

TARGETED SITE ASSESSMENT

SITE NO. 1-52-193

CENTRAL ISLIP, NEW YORK



WORK ASSIGNMENT NO. D003600-46

Prepared for:

**NEW YORK STATE DEPARTMENT OF
ENVIRONMENTAL CONSERVATION**

Prepared by:

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WOODBURY, NEW YORK**

NOVEMBER 2005

Section 1

1.0 INTRODUCTION

Work Assignment No. D003600-46 was issued to Dvirka and Bartilucci Consulting Engineers (D&B) by the New York State Department of Environmental Conservation (NYSDEC) to conduct a site investigation at the former Central Islip Psychiatric Center (PC) Brownfield site in Central Islip, Suffolk County, New York. This investigation is being conducted by the NYSDEC using funds provided by a grant from the United States Environmental Protection Agency (USEPA) Targeted Site Assessment Program.

The site was sold by the New York State Office of Mental Health to the Town of Islip on October 20, 1977. It is our understanding that the Town may use the site for expansion of an existing park on the parcel to the north of the site and/or for construction of affordable housing for workforce development.

The remainder of this document consists of six sections. Section 2.0 provides a site description and summary of background information for the site. Section 3.0 provides the technical scope of work for the site investigation. Section 4.0 presents the findings of the site investigation and evaluates soil and groundwater data relative to standards, criteria and guidelines. Section 5.0 provides a qualitative human health exposure assessment for the site contamination. Section 6.0 provides conclusions regarding the nature of the identified contamination. Section 7.0 provides recommendations regarding the contamination and the need for remediation.

Section 2

2.0 SUMMARY OF BACKGROUND INFORMATION

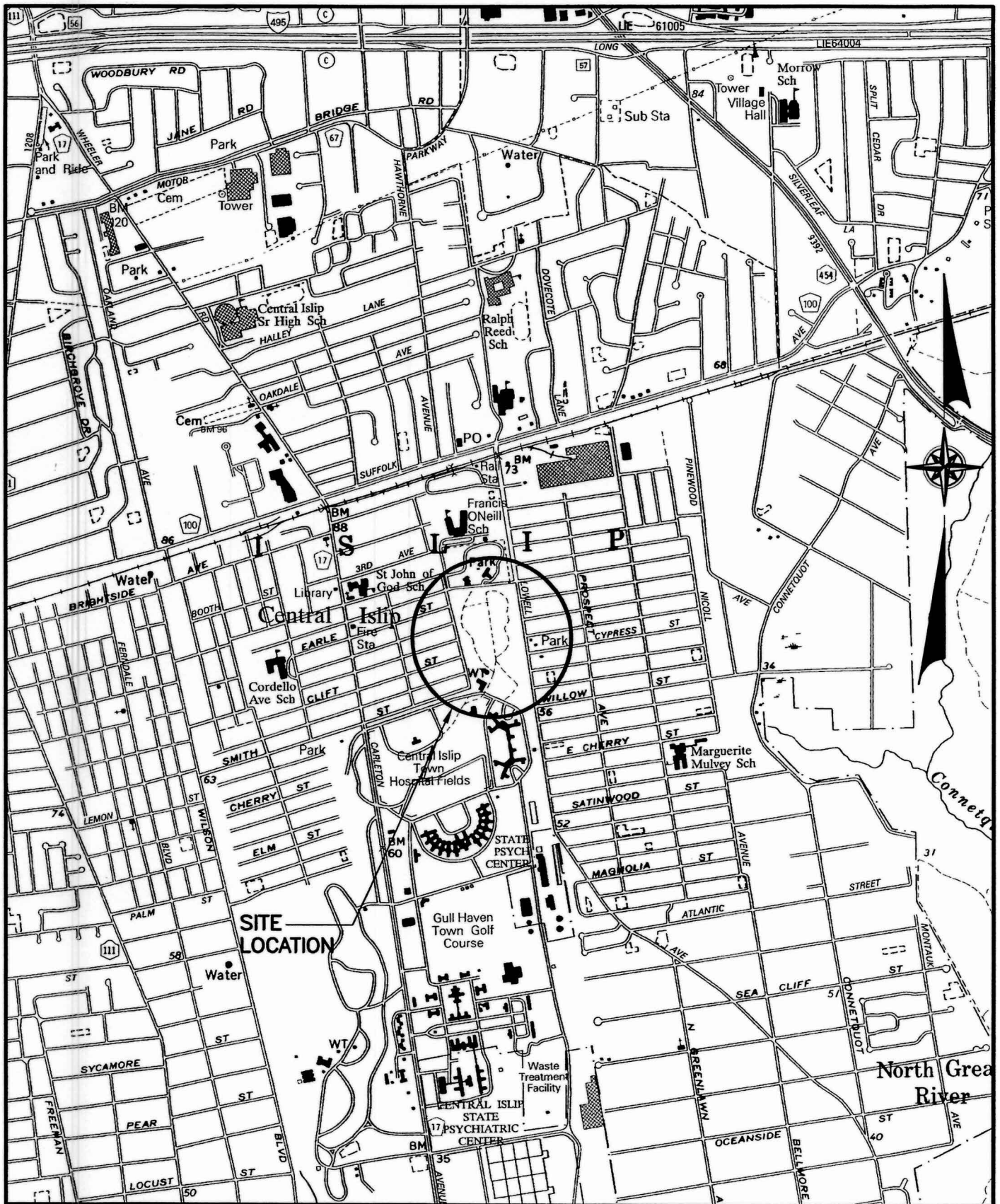
2.1 Site Description

The former Central Islip Psychiatric Center (PC) Site is located in the northern portion of the entire former Central Islip PC property in the Town of Islip, New York (see Figure 2-1). The site is designated tax parcel District 500, Section 207, Block 1, Lot 3.3.

The property is approximately 30 acres in size and is bounded by Clayton Street on the north, Lowell Avenue on the east, and Audwin Drive on the west. The southern site boundary is irregular. The property usage in the vicinity of the site includes a Town park and a senior citizen center to the north, remnant structures of the former Central Islip PC facility to the south and residential properties to the east and west. The remnant structures in the immediate site vicinity include the foundations of a water tower and garage, a concrete pad, roadways and vacant four-story patient ward buildings.

The following site description is based on site visits conducted by D&B on February 11 and 22, 2005. The site is bordered by a chain link fence along the streets to the north, east and west. Portions of this fence are non-continuous, allowing uncontrolled access to the site. The majority of the property is overgrown with trees and thick underbrush. A one-lane north-south asphalt road exists through the approximate center of the site. Some remnants of paved paths or roads, primarily branching out from the central roadway, are also apparent, as shown by either asphalt paving or tree-lined paths.

The site is relatively flat, except for three berms, including two parallel berms, approximately 5 feet in height which delineate a former railroad right of way along the eastern site boundary, and a third, slightly higher berm in the southwestern portion of the site. A concrete abutment and partly exposed concrete pad are present near the southern edge of this berm. Remnants of former building foundations and several utility manholes (for electrical lines, water supply piping, and possibly sanitary sewer pipes) were also observed throughout the site.



SOURCE: UNITED STATES GEOLOGICAL SURVEY CENTRAL ISLIP QUADRANGLE

SCALE : 1" = 2000'

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
FORMER CENTRAL ISLIP PSYCHIATRIC CENTER

db Dvirka
and
Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

SITE LOCATION MAP

FIGURE 2-1

The general site layout is illustrated on Figure 2-2, and includes the locations of existing site features and historical features.

Illegal dumping has occurred throughout the site, primarily along the central site roadway. The identified debris includes abandoned automobiles, appliances, a boat, construction and demolition debris, tires, buckets, bicycles and a few empty rusted drums. A detailed discussion of site conditions is provided in Section 3.2.

2.2 Site History

The site history described in this section was derived from various sources, including:

- NYSDEC files;
- Suffolk County Department of Health Services (SCDHS) files;
- Dormitory Authority - State of New York (DASNY), the agency that managed the Central Islip PC Site when it was state-owned, files;
- State of New York Office of Mental Health files;
- Town of Islip Building Department files; and
- Historic aerial photographs obtained from a commercial vendor.

The site was initially developed during the 1890's with the construction of eight one-story structures at the former Central Islip PC. The inferred uses of these buildings are six patient ward buildings, a dining hall building and a staff residence building. The locations of these buildings are shown in Figure 2-2. Available documents for Wards. 4, 5 and 6 and the Dining Hall indicate that these buildings were constructed of wood, with brick foundations and basements. Reported building utilities for all eight structures include electric lines, low pressure steam and cast iron radiators, gravity ventilation, galvanized steel cold and hot water piping, fire protection standpipes with alarm systems, and cast iron sanitary waste lines.

According to the DASNY employee who formerly was the maintenance manager at the Central Islip PC, building utility services were remotely provided from on-site facilities located south of the site in other areas of the former Central Islip PC. These services included steam for heat, electricity, sanitary waste disposal and potable water. Electrical power for the entire Central Islip PC was provided by a power plant that burned coal until approximately the 1970s, and thereafter burned oil. The coal was delivered to the power plant by railroad. As shown on historic aerial photographs, the railroad tracks were present along the western site boundary from prior to 1954 until approximately 1969, after which time rail road was relocated to the eastern site boundary in the vicinity of the two existing berms. It is possible that the western railroad spur was associated with the berm and concrete abutment currently present in the southwestern portion of the site (see Figure 2-2). Although the specific use of these features is currently unknown, coal and slag fragments present in their vicinity may indicate that coal was transported or stored in this area. In addition, it was reported that coal ash was historically used throughout the former Central Islip PC as roadbed materials for streets, paths and railroad tracks.

Historic documents show that the sanitary sewer lines connecting the site buildings to the off-site wastewater treatment plant were constructed of 6-inch diameter, vitreous clay pipe. The reported sanitary piping layout is shown on Figure 2-2.

Aerial photographs for the years 1954, 1969, 1976, 1980, 1990 and 2000 were reviewed. The 1954 photograph (provided in Appendix A) shows the locations of the eight former on-site buildings described above, as well as other ward buildings and an inferred staff residence (see Figure 2-2). By 1969, only Wards 4, 5 and 6, and the dining hall were still present at the site, with the other buildings having been demolished. Between 1954 and 1969, the railroad along the western boundary was relocated to the eastern site boundary. The field observation of partial foundations and bricks, and either mounding or subsidence at the apparent locations of the former buildings, suggests that these buildings were demolished and the basements filled with the resulting construction and demolition (C&D) debris. By 1980, all on-site buildings had been demolished.

2.3 Geology and Hydrogeology

The ground surface elevation at the site is approximately 60 feet above mean sea level. Based on published United States Geological Survey reports, the regional geology is comprised of glacial outwash sands with no reported significant clay layers to at least 50 feet below grade.

Based on published information and observations made during this field investigation, the depth to groundwater at the site is approximately at 30 feet below grade. Water table elevation contour maps prepared by the SCDHS show that the regional shallow groundwater flow is toward the southeast.

Section 3

3.0 STUDY AREA INVESTIGATION

This section presents the investigation scope that was implemented for the former Central Islip PC Site. Field activities were conducted in accordance with the NYSDEC-approved Work Plan.

The investigation scope included:

- A detailed site reconnaissance survey for manholes, building foundations, significant areas of illegal dumping and other areas of potential environmental concern;
- Field mark-out of former building locations, the southern site boundary and field data points;
- Surface and shallow subsurface soil sampling;
- Limited investigation of site hydrogeology;
- Groundwater sampling; and
- Asbestos screening survey of utilities within manholes and utility conduits.

The details of these activities are provided below.

3.1 Field Mark-outs and Data Point Location

The purpose of this task was to locate the eight former on-site buildings and the southern site boundary prior to sample collection, and to subsequently locate sampling points after the sampling program had been completed. This task was conducted by D&B and NYSDEC personnel, and did not involve a land surveying subcontractor.

The locations of the site features shown on Figure 2-2 were determined from historic aerial photographs and other file documents. Based on this information, the primary corners of the eight former on-site buildings, as well as the intersections and corners of the southern site property boundary, were staked in the field.

After completion of the remainder of the field sampling program (described below), the sample locations were measured in the field relative to site features such as roadways and the staked building corners. Sample points included manholes, test pits outside of building foundations, areas of illegal dumping, and soil and groundwater sampling points. NYSDEC personnel revisited the staked points described above and recorded each location using Global Positioning System (GPS) instrumentation. Assistance in the location of these points was provided by D&B personnel. The map and the data point coordinates generated by the GPS survey are provided in Appendix B.

3.2 Site Reconnaissance Survey

A site reconnaissance survey was conducted during development of the work plan to assess the site features and identify areas of potential environmental concern. Since the survey findings were used to develop the sampling plan and rationale for this investigation, the survey scope and findings are presented in this investigation report. The survey focused on identification of significant areas of illegal dumping, manholes, building foundations, and other structures and pertinent features of potential environmental concern.

The reconnaissance survey was conducted across the site using a grid with an approximate node spacing of 100 feet. The grid transects were parallel to the northern and eastern site boundaries. The grid was created using a compass and reference points were marked along the property boundaries and site roads. The survey areas and features were characterized as follows:

- In areas of illegal dumping, the extent and nature of dumped materials, integrity of containers, and evidence of leakage and spillage were identified;
- Manholes were opened and the contents were evaluated in an attempt to identify utility type, utility depth and conduit material; and
- The limits of building foundations and the horizontal extent of possible fill material were investigated by surficial evidence such as concrete pads or apparent former foundation walls.

The areas of potential environmental concern that were identified during the site reconnaissance survey are shown on Figure 3-1. The nature of the areas are also provided on the figure. The areas included illegally dumped items, such as:

- tree stumps and wood;
- construction and demolition debris;
- automobiles, automobile parts and fluids, and gasoline cans;
- residential materials such as roofing shingles, household garbage, driveway sealer, roofing tar, propane tanks and appliances; and
- a drum of Freon.

Figure 3-1 also includes the locations of manholes. A description of the manholes and observed contents is provided in Section 3.5.

3.3 Investigation and Sampling of Former Building Foundations

The building foundations were investigated by excavation of two test pits within the footprint of each of the eight former site buildings. To excavate the test pits, a rubber-tire backhoe with the capacity to excavate to at least 10 feet was utilized. A bulldozer was initially utilized to clear brush areas to provide access the building locations. The test pits were extended through the basement foundations into the underlying natural material.

The material encountered in each test pit was examined and logged by a D&B geologist for material type, thickness, appearance, composition, staining, odor and other pertinent characteristics. This material was also screened for volatile organic compounds (VOCs) using a photoionization detector (PID) and for radiation using a Geiger counter.

The two test pits within each building footprint were evenly located within the building footprint or biased toward the edges of the building footprint where either underground utilities entered the building or manholes, or unknown structures such as pipes or potential drainage structures were located adjacent to the former foundation wall.

To characterize the soil quality within each building foundation, five samples were collected from the test pits as follows:

- One composite sample was collected from the two test pits excavated within the inferred Staff Residence building foundation;
- One composite sample was collected from the two test pits excavated within the Dining Hall building foundation; and
- Three composite samples were collected from the 12 test pits excavated within the site patient ward building foundations. Due to the similar building use as patient residences, the ward buildings were paired for purposes of sampling. As a result, composite samples were collected from Wards 4 and 5, Wards 6 and 7, and Wards 8 and 9.

The composite samples were collected from similar material from within the three building groups, based on sensory characterization (composition, odor or staining), and VOC and Geiger counter field screening results. Since no elevated VOC or Geiger counter measurements were associated with these samples, samples were randomly collected from each test pit. Each sample was analyzed for Target Compound List (TCL) semivolatile organic compounds (SVOCs), Target Analyte List (TAL) metals and cyanide. One sample from a test pit from each of the building groups (Dining Hall, Staff Residence and ward buildings) were additionally analyzed for TCL VOCs.

After excavation and sampling of each test pit was completed, it was backfilled in reverse order using the material that was excavated (i.e., last out, first in) and compacted with the backhoe bucket. The backfilled pit was then located on a field map and staked in the field as described in Section 3.1.

3.4 Surface and Shallow Subsurface Soil Sampling

In order to evaluate soil quality across the site and provide information to facilitate redevelopment of the property, surface and shallow subsurface soil samples were collected. Surface soil samples were collected from a depth of 0 to 2 inches below grade and the shallow subsurface soil samples were collected from a depth of 18 to 24 inches.

The surface and subsurface samples were collected at 32 locations shown on Figure 3-1, and summarized as follows:

- Twelve locations in the vicinity of the six former patient ward buildings (each a composite sample from two of the four building sides);
- Four locations surrounding the former Dining Hall building (each a grab sample from one side of the building);
- Four locations surrounding the Staff Residence building (each a grab sample from one side of the building); and
- Twelve locations at miscellaneous areas of potential environmental concern across the site, including the concrete pad in the southwestern area of the site, areas of illegal dumping, and areas of buried utilities.

The samples collected around building foundations were located within 25 feet of the building foundations. Sampling the miscellaneous areas of concern was biased toward locations with indications of impacts such as staining or beneath dumped items within the areas.

Because of the overgrown nature of the site and the difficulty for vehicle access, the surface and shallow subsurface soil samples were collected manually using new, dedicated sampling scoops and/or a decontaminated hand auger.

The soil samples were analyzed for TCL SVOCs, TAL metals and cyanide. Twenty percent of the samples were also analyzed for TCL VOCs and PCBs. The samples to be analyzed for these additional parameters were selected based on the field screening results (elevated PID results and for sensory characterization), site conditions (areas of oil or appliance dumping) or

randomly to represent the various building and sampling area groups. The samples for VOC analysis were selected as described for the building foundation material in Section 3.3.

3.5 Hydrogeology

A soil conductivity survey was conducted to investigate the site geology and to evaluate the presence of low permeability layers in the vadose zone between ground surface and the water table. This remote survey incorporated a direct sensing probe and a direct push rig, and was conducted on June 29, 2005 by Zebra Environmental Corporation. The logging was conducted at two locations, one along the northern property boundary (L-1) and one along the southern property boundary (L-2). Locations are shown on Figure 3-1.

The site-specific groundwater flow direction was determined by converting three groundwater sampling points to piezometers. The three points (designated PZ-1 through PZ-3 on Figure 3-1) were approximately equally spaced around the site.

The piezometers were constructed of 1-inch diameter PVC screen and casing. The 10-foot long screen was installed across the water table in each piezometer and the piezometers were completed at grade with locking curb boxes. Piezometer construction logs are provided Appendix D. The tops of the PVC casings were surveyed by YEC, Inc., a New York State-licensed surveyor.

Water levels were collected from the piezometers on July 1, 2005 and September 26, 2005. The levels were collected using an electronic water level indicator.

3.6 Groundwater Sampling

The regional groundwater flow direction is reportedly toward the southeast and the upgradient land use along the main thoroughfares approximately a mile northwest of the site (beyond the surrounding residences and adjacent park) is light commercial, including gasoline service stations. In order to assess whether historic activities at the site have impacted

groundwater quality beneath the site, or whether there are upgradient sources of groundwater contamination, six groundwater samples were collected. Two samples were collected upgradient of the site and four samples were collected downgradient of the site, as shown on Figure 3-1.

The groundwater samples were collected within 5 feet of the water table using the direct push method. The samples were analyzed for TCL VOCs, TCL SVOCs, TCL PCBs, dissolved TAL metals and cyanide. Samples for metals analysis were filtered by the laboratory.

3.7 Asbestos Survey

In order to provide information to facilitate redevelopment of the site, an asbestos screening survey and sampling program was conducted by Testing Mechanics Corporation. The objective of the survey was to evaluate the presence of asbestos that may be associated with site utilities or dumped materials. The survey was conducted on July 6, 2005 and included a visual inspection of accessible manholes and other suspected asbestos-containing material potentially associated with utility conduits, the former buildings and illegal dumping at the site. A backhoe was used to facilitate access to several manholes where the presence of buried conduits was suspected.

Samples collected for friable asbestos analysis were analyzed by polarized light microscopy (PLM). Negative results were confirmed with transmission electron microscopy (TEM).

Section 4

4.0 FINDINGS OF THE SITE INVESTIGATION

This section presents the findings of investigation activities. These findings include characterization of former building foundations and miscellaneous areas of concern throughout the site, and investigations of the site hydrogeology and the presence of asbestos. Additionally, the analytical results of the soil and groundwater quality are presented and evaluated with respect to standards, criteria and guidelines.

4.1 Characteristics of Former Building Foundations

The basements of the Wards 4, 5 and 6 buildings were constructed with concrete floors. The basements of Wards 7, 8 and 9, the dining hall and inferred staff residence buildings were earthen, without concrete floors. All of the investigated foundations were filled with construction and demolition (C&D) debris comprised of poorly sorted fine to medium-grained sand, with cobbles, fragments of brick and concrete, and other building remnants such as ornamental stone and light fixtures. Logs for the test pits excavated within the building foundations are provided in Appendix D.

4.2 Identification of Standards, Criteria and Guidelines

The standards, criteria and guidelines (SCGs) to which the analytical results for the soil samples were compared were Recommended Soil Cleanup Objectives (RSCOs) contained in New York State Department of Environmental Conservation (NYSDEC) Technical Administrative Guidance Memorandum (TAGM) 4046, "Determination of Soil Cleanup Objectives and Cleanup Levels."

The analytical results for groundwater were compared to NYSDEC Class GA Groundwater Standards and Guidance Values. These values are contained in June 1998 NYSDEC Technical and Operational Guidance Series 1.1.1, "Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations," the January Errata Sheet, and Addenda dated April 2000 and June 2004.

4.3 Soil Quality

Soil samples were collected from the former building foundations, around the exterior perimeter of the buildings and at miscellaneous areas of concern based on historical activities such as coal storage, and areas of illegal dumping located throughout the site. The locations of the sampling points are shown on Figure 3-1. The individual samples that were combined to create composite samples in the foundation and building area samples are denoted on the figure.

Except for one sample, no elevated field screening measurements (volatile organic vapors or radiation) were detected in the soil samples collected during the investigation. The exception, sample M-4, showed a low PID measurement of 3.3 parts per million (ppm). Sample M-4 was collected along the west boundary of the site where containers of automotive fluids were present.

Specific summary tables presenting exceedances of the SCGs for each sampling group are referenced in the sections below which discuss the results by analyte group. Table 4-1 provides the ranges of concentrations above SCGs in the soil for each sampling group, the building foundations, the building perimeters and miscellaneous areas of concern. Laboratory data sheets for the investigation analytical results are provided in Appendix F. Tabulated analytical results are provided in the tables in Appendix G.

4.3.1 Former Building Foundations

To facilitate reference to the sample results, the building foundation designations and test pit samples locations are as follows:

- CIP-TP-DH - Dining Hall Building
- CIP-TP-RH - Inferred Residence Staff Building
- CIP-TP-W4/5 - Patient Wards 4 and 5
- CIP-TP-W6/7 - Patient Wards 6 and 7
- CIP-TP-W8/9 - Patient Wards 8 and 9

Table 4-1

**FORMER CENTRAL ISLIP PSYCHIATRIC CENTER
TARGETED SITE ASSESSMENT
RANGES OF CONCENTRATIONS
ABOVE RECOMMENDED SOIL CLEANUP OBJECTIVES IN SOIL SAMPLES**

Constituent	Within Building Foundations (Test Pits)	Perimeter of Buildings		Miscellaneous Areas of Concern		NYSDEC Recommended Soil Cleanup Objective
		Surface 0-2"	Subsurface 18-24"	Surface 0-2"	Subsurface 18-24"	
<i>Semivolatile Organic Compounds (ug/kg)</i>						
Benzo(a)anthracene	240 – 2,400	240 – 2,000	270*	280 – 14,000	340 – 9,400	224
Chrysene	640 – 2,900	800 – 2,600	--	1,100 – 24,000	1,200*	400
Benzo(b)fluoranthene	1,400 – 2,600	1,200 – 2,300	--	2,100 – 24,000	6,100*	1,100
Benzo(k)fluoranthene	1,800*	--	--	2,800 – 12,000	2,800*	1,100
Benzo(a)pyrene	120 – 2,900	68 – 2,000	69 – 270	270 – 21,000	280 – 7,800	61
Dibenzo(a,h)anthracene	120 - 310	43 -240	--	40 – 2,300	44 – 720	14
Indeno(1,2,3-cd)anthracene	--	--	--	4,100 – 5,200	--	3,200
<i>Metals (mg/kg)</i>						
Arsenic	--	--	--	7.7 – 37.9	9.6*	7.5
Beryllium	0.17 – 0.20	0.17 – 0.25	0.17 – 0.25	0.17 – 0.56	0.17 – 0.27	16
Copper	56.3*	30.7*	25.6*	30.9 – 64	--	25
Iron	2,280 – 8390	5,500 – 8,670	3,450 – 10,400	3,750 – 31,600	1,450 – 18,000	2,000
Lead	712 – 3,280	436 – 1,380	--	--	--	400
Mercury	0.18 – 2.3	0.11 – 0.14	0.11 – 0.15	0.11 – 0.22	--	0.10
Nickel	29 – 78.1	0.22*	--	20.8 – 45.7	--	13
Zinc	50.9 - 149	28.2 – 168	21.8 – 40.8	21.4 - 186	21.7 – 30.4	20

“--”: No exceedance

*: Single sample

The results are discussed by analyte group below.

Organic Compounds

No volatile organic compounds (VOCs) or PCBs were detected in any samples collected from the former building foundations. A limited number of semivolatile organic compounds (SVOCs) were detected in the foundation samples. The SVOC exceedances are summarized in Table 4-2 and their distribution is graphically shown in Figure 4-1.

Marginal contamination (within approximately one order of magnitude of SCGs) was detected in the inferred staff residence building and Wards 4 and 5 building foundations. Two polycyclic aromatic hydrocarbons (PAHs), benzo(a)anthracene and benzo(a)pyrene, were detected in samples from the inferred staff residence building foundation either near their SCGs or within an order of magnitude higher.

The occurrence of SVOCs in the remaining building foundations, the Wards 6 and 7, Wards 8 and 9, and the dining hall, were more frequent and generally similar to each other in concentration. Four to six SVOCs, all PAHs, were detected above SCGs in these samples. The detected compounds exceeding SCGs in most samples included benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene and dibenzo(a,h)anthracene. Benzo(b)fluoranthene was not detected above the SCG at Wards 4 and 5, and benzo(k)fluoranthene exceeded the SCG only in the dining hall sample. Individual PAH concentrations that exceeded SCGs ranged between 120 micrograms per kilogram (ug/kg) and 2,900 ug/kg, up to two orders of magnitude above the SCGs.

Metals

Up to seven metals were detected in the samples from the former building foundations. The exceedances of SCGs for metals in the former building foundations are summarized in Table 4-3 and the distribution of the exceedances is graphically shown on Figure 4-2.

Table 4-2

CENTRAL ISLIP PSYCHIATRIC CENTER TARGETED SITE ASSESSMENT

SEMIVOLATILE ORGANIC COMPOUND CONCENTRATIONS EXCEEDING NYSDEC
RECOMMENDED SOIL CLEANUP OBJECTIVES IN BUILDING FOUNDATION SAMPLES

SAMPLE ID	CIP-TP-DH	CIP-TP-RH	CIP-TP-W4/5	CIP-TP-W6/7	CIP-TP-W8/9	LABORATORY QUANTITATION LIMITS	NYSDEC Recommended Soil Cleanup Objectives
SAMPLE DEPTH (FT)	NA	NA	NA	NA	NA		
DATE OF COLLECTION	7/6/2005	7/5/2005	7/6/2005	7/6/2005	7/5/2005		
DILUTION FACTOR	1.0	1.0	1.0	1.0	1.0		
PERCENT SOLIDS	91.0	87.0	90.0	90.0	93.0		
UNITS	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	(ug/Kg)	(ug/Kg)
Benzo(a)anthracene	2,400	240 J	770	1,200	1,700	550	224 OR MDL
Chrysene	2,900	200 J	640	1,100	1,900	550	400
Benzo(b)fluoranthene	2,600	96 J	850	1,400	2,000	550	1,100
Benzo(k)fluoranthene	1,800	43 J	390	690	910	550	1,100
Benzo(a)pyrene	2,900	120 J	670	1,200	1,600	550	61 OR MDL
Dibenzo(a,h)anthracene	230 J	U	120 J	240 J	310 J	550	14 OR MDL

QUALIFIERS:

U: Compound analyzed for but not detected

J: Compound found at a concentration below the CRDL, value estimated

NOTES:

MDL: Method detection limit

 Indicates value exceeds NYSDEC Recommended Soil Clean-up Objective

Table 4-3

CENTRAL ISLIP PSYCHIATRIC CENTER TARGETED SITE ASSESSMENT

METALS CONCENTRATIONS EXCEEDING NYSDEC
RECOMMENDED SOIL CLEANUP OBJECTIVES IN BUILDING FOUNDATION SAMPLES

SAMPLE ID	CIP-TP-DH	CIP-TP-RH	CIP-TP-W4/5	CIP-TP-W6/7	CIP-TP-W8/9	INSTRUMENT DETECTION LIMITS	NYSDEC Recommended Soil Cleanup Objectives	Eastern United States Background Concentration
SAMPLE DEPTH	NA	NA	NA	NA	NA			
DATE OF COLLECTION	7/6/2005	7/5/2005	7/6/2005	7/6/2005	7/5/2005			
DILUTION FACTOR	1.0	1.0	1.0	1.0	1.0			
PERCENT SOLIDS	91.0	87.0	90.0	90.0	93.0			
UNITS	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	ug/l	mg/Kg	mg/Kg
Beryllium	0.17 B	0.073 B	0.15 B	0.2 B	0.2 B	0.5	0.16 or SB	0-1.75
Copper	16.6	5.1 B	15.7	56.3	21.1	4	25 or SB	1-50
Iron	8,390	2,280	7,340	8,210	6,850	26	2,000 or SB	2,000-550,000
Lead	712	6.9	2,550	1,740	3,280	4	400	Widely variable
Mercury	0.078	U	0.18	0.27	2.3	0.1	0.1	0.001-0.2
Nickel	7	3.3 B	78.1	29	5.5 B	0.8	13 or SB	0.5-25
Zinc	50.9	13.5	149	219	134	7	20 or SB	9-50

QUALIFIERS:

U: Compound analyzed for but not detected

B: Compound concentration is less than the CRDL but greater than the IDL

NOTES:

SB: Site background

 Indicates value exceeds the NYSDEC Recommended Soil Cleanup Objective

Concentrations of metals ranged from slight exceedances of SCGs to within an order of magnitude of SCGs, as shown in Table 4-3. Many of these metals concentrations were well within Eastern United States background levels as provided in TAGM 4046.

In the inferred staff residence hall location, only iron was detected, at a concentration marginally above the SCG. In the sample from the dining hall, exceedances were detected for beryllium, iron, lead and zinc (see Table 4-3). The exceedances were within the same order of magnitude as the SCGs.

In the sample from Wards 4 and 5, five metals (iron, lead, mercury, nickel and zinc) exceeded SCGs. The samples from Wards 6 and 7, and Wards 8 and 9 contained beryllium, iron, lead, mercury and zinc at concentrations above SCGs. Additionally, copper and nickel were detected at concentrations marginally above SCGs in the sample from Wards 6 and 7.

4.3.2 Perimeter of Former Buildings

To facilitate reference to the sample results, the building foundation designations and soil sample locations are as follows:

- CIP-DH (1 through 4) - Dining Hall Building
- CIP-RH (1 through 4) - Inferred Residence Staff Building
- CIP-W4 through W9 (1 and 2) - Wards 4 through 9; samples 1 and 2 are each a composites of two building sides

The results are discussed by analyte group below.

Organic Compounds

No VOCs or PCBs were detected in the samples collected from the perimeter samples of the former buildings. A limited number of SVOCs were detected in the samples (see Table 4-4 and Figure 4-1).

Table 4-4

CENTRAL ISLIP PSYCHIATRIC CENTER TARGETED SITE ASSESSMENT

SEMIVOLATILE ORGANIC COMPOUND CONCENTRATIONS EXCEEDING NYSDEC
RECOMMENDED SOIL CLEANUP OBJECTIVES IN BUILDING VICINITY SAMPLES

SAMPLE ID	CIP-DH-1	CIP-DH-2	CIP-DH-3	CIP-DH-4	CIP-DH-4	CIP-RH-1	CIP-RH-2	CIP-RH-3	LABORATORY QUANTITATION LIMITS	NYSDEC Recommended Soil Cleanup Objectives
SAMPLE DEPTH	0-2 IN	18-24 IN	0-2 IN	0-2 IN	18-24 IN	0-2 IN	0-2 IN	0-2 IN		
DATE OF COLLECTION	6/27/2005	6/27/2005	6/27/2005	6/27/2005	6/27/2005	6/27/2005	6/27/2005	6/27/2005		
DILUTION FACTOR	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		
PERCENT SOLIDS	90.0	94.0	94.0	94.0	94.0	93.0	90.0	94.0		
UNITS	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	(ug/Kg)	(ug/Kg)
Benzo(a)anthracene	810	190 J	170 J	74 J	100 J	440	100 J	1,600	550	224 OR MDL
Chrysene	940	190 J	270 J	110 J	130 J	800	190 J	2,000	550	400
Benzo(b)fluoranthene	1,100	210 J	250 J	110 J	140 J	700	160 J	1,900	550	1,100
Benzo(a)pyrene	900	200 J	220 J	86 J	100 J	570	110 J	1,400	550	61 OR MDL
Dibenzo(a,h)anthracene	95 J	U	U	U	U	91 J	U	140 J	550	14 OR MDL

SAMPLE ID	CIP-RH-4	CIP-RH-4	CIP-W4-1	CIP-W4-2	CIP-W5-1	CIP-W5-1	CIP-W5-2	CIP-W6-1	LABORATORY QUANTITATION LIMITS	NYSDEC Recommended Soil Cleanup Objectives
SAMPLE DEPTH	0-2 IN	18-24 IN	0-2 IN	0-2 IN	0-2 IN	18-24 IN	0-2 IN	0-2 IN		
DATE OF COLLECTION	6/27/2005	6/27/2005	6/29/2005	6/29/2005	6/28/2005	6/28/2005	6/29/2005	6/28/2005		
DILUTION FACTOR	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		
PERCENT SOLIDS	94.0	97.0	90.0	83.0	83.0	91.0	87.0	89.0		
UNITS	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	(ug/Kg)	(ug/Kg)
Benzo(a)anthracene	860	270 J	240 J	84 J	2,000	65 J	96 J	320 J	550	224 OR MDL
Chrysene	940	240 J	320 J	120 J	2,600	83 J	150 J	380	550	400
Benzo(b)fluoranthene	1,200	340 J	300 J	110 J	2,300	72 J	140 J	490	550	1,100
Benzo(a)pyrene	890	270 J	240 J	95 J	2,000	69 J	110 J	340 J	550	61 OR MDL
Dibenzo(a,h)anthracene	94 J	U	43 J	U	410	U	U	63 J	550	14 OR MDL

SAMPLE ID	CIP-W7-1	CIP-W7-2	CIP-W8-1	CIP-W9-1	CIP-W9-2				LABORATORY QUANTITATION LIMITS	NYSDEC Recommended Soil Cleanup Objectives
SAMPLE DEPTH	0-2 IN	0-2 IN	0-2 IN	0-2 IN	0-2 IN					
DATE OF COLLECTION	6/28/2005	6/28/2005	6/27/2005	6/28/2005	6/28/2005					
DILUTION FACTOR	1.0	1.0	1.0	1.0	1.0					
PERCENT SOLIDS	81.0	87.0	96.0	87.0	93.0					
UNITS	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg				(ug/Kg)	(ug/Kg)
Benzo(a)pyrene	110 J	230 J	68 J	160 J	240 J				550	61 OR MDL
Dibenzo(a,h)anthracene	U	44 J	U	U	43 J				550	14 OR MDL

QUALIFIERS:

U: Compound analyzed for but not detected

J: Compound found at a concentration below the CRDL, value estimated

NOTES:

MDL: Method detection limit

Indicates value exceeds NYSDEC Recommended Soil Clean-up Objective

The detected SVOCs and concentrations were similar in the vicinity of the dining hall, Ward 4, and Ward 6 through 9. Exceedances of SCGs for SVOCs were detected primarily only in the surface (0 to 2-inch) samples. Up to four SVOCs were detected at elevated concentrations in these samples, including benzo(a)anthracene, chrysene, benzo(a)pyrene, and dibenzo(a,h)anthracene. The maximum total SVOC concentration in these samples was 9,435 ug/kg.

The occurrence and concentrations of SVOCs were similar around the inferred staff residence building and Ward 5, with exceedance of SCGs for more SVOCs and detected concentrations up to an order of magnitude higher than the SCGs. In addition to the SVOCs identified in the vicinity of the other buildings (as noted above), benzo(b)fluoranthene was also present above its SCG in samples from the inferred staff residence building and Ward 5.

Metals

Exceedances of SCGs for beryllium, iron and zinc were detected in the majority of samples collected near the former buildings (see Table 4-5 and Figure 4-2).

Iron exceedances were ubiquitous throughout the site and occurred in both the surface (0 to 2-inch) and subsurface (18 to 24-inch) samples at generally similar concentrations. The concentration range for SCG exceedances of 3,450 milligrams per kilograms (mg/kg) to 10,400 mg/kg was within the same order of magnitude of the SCG of 2,000 mg/kg.

Beryllium was detected at concentration up to 0.25 mg/kg, marginally above the SCG of 0.16 mg/kg. The distribution and concentrations of these metals (see Figure 4-2) in soil suggest that the detected concentrations may represent background levels. The iron concentrations are within the Eastern United States background level range of 2,000 mg/kg to 550,000 mg/kg, as provided in TAGM 4046.

Table 4-5

CENTRAL ISLIP PSYCHIATRIC CENTER TARGETED SITE ASSESSMENT
METALS CONCENTRATIONS EXCEEDING NYSDEC
RECOMMENDED SOIL CLEANUP OBJECTIVES IN BUILDING VICINITY SAMPLES

SAMPLE ID	CIP-DH-1	CIP-DH-1	CIP-DH-2	CIP-DH-2	CIP-DH-3	CIP-DH-3	CIP-DH-4	CIP-DH-4	INSTRUMENT	NYSDEC	Eastern
SAMPLE DEPTH	0-2 IN	18-24 IN	0-2 IN	18-24 IN	0-2 IN	18-24 IN	0-2 IN	18-24 IN	DETECTION	Recommended	United States
DATE OF COLLECTION	6/27/2005	6/27/2005	6/27/2005	6/27/2005	6/27/2005	6/27/2005	6/27/2005	6/27/2005	LIMITS	Soil Cleanup	Background
DILUTION FACTOR	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		Objectives	Concentration
PERCENT SOLIDS	90.0	94.0	96.0	94.0	94.0	94.0	94.0	94.0			
UNITS	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	ug/l	mg/Kg	mg/Kg
Beryllium	0.13 B	0.21 B	0.16 B	0.21 B	0.17 B	0.17 B	0.2 B	0.17 B	0.5	0.16 or SB	0-1.75
Copper	30.7	5.4	6.6	2.4 B	15.8	4.2 B	6.7	41.7	4	25 or SB	1-50
Iron	7,900	6,720	5,790	7,360	7,420	7,260	6,850	8,400	26	2,000 or SB	2,000-550,000
Lead	900	19	44.1	9	568	35.4	67.5	251	4	400	Widely variable
Mercury	0.14	U	U	U	0.11	U	0.056 B	0.15	0.1	0.1	0.001-0.2
Zinc	168	16.2	28.2	9.8	67.2	30.6	33.3	27.3	7	20 or SB	9-50

SAMPLE ID	CIP-RH-1	CIP-RH-1	CIP-RH-2	CIP-RH-2	CIP-RH-3	CIP-RH-3	CIP-RH-4	CIP-RH-4	INSTRUMENT	NYSDEC	Eastern
SAMPLE DEPTH	0-2 IN	18-24 IN	0-2 IN	18-24 IN	0-2 IN	18-24 IN	0-2 IN	18-24 IN	DETECTION	Recommended	United States
DATE OF COLLECTION	6/27/2005	6/27/2005	6/27/2005	6/27/2005	6/27/2005	6/27/2005	6/27/2005	6/27/2005	LIMITS	Soil Cleanup	Background
DILUTION FACTOR	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		Objectives	Concentration
PERCENT SOLIDS	93.0	96.0	90.0	92.0	94.0	97.0	94.0	97.0			
UNITS	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	ug/l	mg/Kg	mg/Kg
Beryllium	0.16 B	0.15 B	0.14 B	0.19 B	0.17 B	0.17 B	0.16 B	0.11 B	0.5	0.16 or SB	0-1.75
Iron	5,690	6,320	6,320	6,300	6,220	5,240	5,980	3,940	26	2,000 or SB	2,000-550,000
Mercury	0.08 B	U	0.094	0.084 B	0.11	U	0.097	U	0.1	0.1	0.001-0.2
Zinc	33.6	13.7	38.5	38.8	36.5	20.2	65	35.1	7	20 or SB	9-50

SAMPLE ID	CIP-W4-1	CIP-W4-1	CIP-W4-2	CIP-W4-2	CIP-W5-1	CIP-W5-1	CIP-W5-2	CIP-W5-2	INSTRUMENT	NYSDEC	Eastern
SAMPLE DEPTH	0-2 IN	18-24 IN	0-2 IN	18-24 IN	0-2 IN	18-24 IN	0-2 IN	18-24 IN	DETECTION	Recommended	United States
DATE OF COLLECTION	6/29/2005	6/29/2005	6/29/2005	6/29/2005	6/28/2005	6/28/2005	6/29/2005	6/29/2005	LIMITS	Soil Cleanup	Background
DILUTION FACTOR	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		Objectives	Concentration
PERCENT SOLIDS	90.0	97.0	83.0	98.0	83.0	91.0	87.0	94.0			
UNITS	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	ug/l	mg/Kg	mg/Kg
Beryllium	0.17 B	0.059 B	0.17 B	0.12 B	0.17 B	0.22 B	0.17 B	0.21 B	0.5	0.16 or SB	0-1.75
Copper	12	1.8 B	9.4	3.3 B	21.5	25.6	16.2	4.2 B	4	25 or SB	1-50
Iron	5,510	1,900	6,320	3,740	8,210	8,880	6,950	8,680	26	2,000 or SB	2,000-550,000
Lead	388	3.1	205	10.1	1170	85.1	436	7.5	4	400	Widely variable
Mercury	0.051 B	U	0.077 B	U	0.12	U	0.064 B	U	0.1	0.1	0.001-0.2
Nickel	3.8 B	1.3 B	5.1 B	2.3 B	22.2	4.7 B	6.7 B	3.8 B	0.8	13 or SB	0.5-25
Zinc	50.2	4.8	48	9.9	132	40.8	59.9	12.3	7	20 or SB	9-50

Table 4-5

CENTRAL ISLIP PSYCHIATRIC CENTER TARGETED SITE ASSESSMENT
METALS CONCENTRATIONS EXCEEDING NYSDEC
RECOMMENDED SOIL CLEANUP OBJECTIVES IN BUILDING VICINITY SAMPLES

SAMPLE ID	CIP-W6-1	CIP-W6-1	CIP-W6-2	CIP-W6-2	CIP-W7-1	CIP-W7-1	CIP-W7-2	CIP-W7-2	INSTRUMENT DETECTION LIMITS	NYSDEC Recommended Soil Cleanup Objectives	Eastern United States Background Concentration
SAMPLE DEPTH	0-2 IN	18-24 IN	0-2 IN	18-24 IN	0-2 IN	18-24 IN	0-2 IN	18-24 IN			
DATE OF COLLECTION	6/28/2005	6/28/2005	6/28/2005	6/28/2005	6/28/2005	6/28/2005	6/28/2005	6/28/2005			
DILUTION FACTOR	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
PERCENT SOLIDS	89.0	97.0	96.0	95.0	81.0	89.0	87.0	94.0			
UNITS	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	ug/l	mg/Kg	mg/Kg
Beryllium	0.23 B	0.12 B	0.11 B	0.063 B	0.25 B	0.25 B	0.17 B	0.13 B	0.5	0.16 or SB	0-1.75
Iron	8,670	3,450	3,570	1,840	7,680	10,400	6,970	6,630	26	2,000 or SB	2,000-550,000
Lead	781	9.2	35.3	2.6	1380	10.3	76.8	10.1	4	400	Widely variable
Mercury	0.086 B	U	U	U	0.099 B	U	0.12	U	0.1	0.1	0.001-0.2
Zinc	133	9.1	11.5	3.5 B	89.4	16.4	29.6	12.7	7	20 or SB	9-50

SAMPLE ID	CIP-W8-1	CIP-W8-1	CIP-W8-2	CIP-W8-2	CIP-W9-1	CIP-W9-1	CIP-W9-2	CIP-W9-2	INSTRUMENT DETECTION LIMITS	NYSDEC Recommended Soil Cleanup Objectives	Eastern United States Background Concentration
SAMPLE DEPTH	0-2 IN	18-24 IN	0-2 IN	18-24 IN	0-2 IN	18-24 IN	0-2 IN	18-24 IN			
DATE OF COLLECTION	6/27/2005	6/27/2005	6/27/2005	6/27/2005	6/28/2005	6/28/2005	6/28/2005	6/28/2005			
DILUTION FACTOR	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
PERCENT SOLIDS	96.0	98.0	95.0	96.0	87.0	96.0	93.0	94.0			
UNITS	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	ug/l	mg/Kg	mg/Kg
Beryllium	0.16 B	0.14 B	0.17 B	0.16 B	0.18 B	0.19 B	0.14 B	0.18 B	0.5	0.16 or SB	0-1.75
Iron	6,310	5,720	6,190	6,770	7,280	6,790	6,170	6,720	26	2,000 or SB	2,000-550,000
Lead	227	7.4	500	266	122	6.3	594	11.2	4	400	Widely variable
Mercury	0.13	U	0.11	U	0.077 B	U	0.048 B	U	0.1	0.1	0.001-0.2
Zinc	34.5	11.4	42	21.8	34.8	9.3	32.3	13.1	7	20 or SB	9-50

QUALIFIERS:

U: Compound analyzed for but not detected

B: Compound concentration is less than the CRDL but greater than the IDL

NOTES:

SB: Site background

 Indicates value exceeds the NYSDEC Recommended Soil Cleanup Objective

Exceedances of the SCG for zinc primarily occurred in the surface (0 to 2-inch) samples. The exceedance concentrations ranged between 28.2 mg/kg and 168.0 mg/kg, and were generally near the SCG of 20 mg/kg. Two elevated zinc concentrations were detected in the samples around Wards 6 and 7, with concentrations between 29.6 mg/kg and 133 mg/kg (see Figure 4-2).

Four other metals (copper, lead, mercury and nickel) were sporadically detected at concentrations above SCGs. The majority of the concentrations were only marginally above the SCGs. The only exception to this was lead in two surface soil samples around Wards 5 and 7, where the lead concentrations (1,170 mg/kg and 1,380 mg/kg) were up to four times higher than the SCG of 400 mg/kg. Toxicity Characteristic Leaching Procedure (TCLP) analysis was conducted for lead on these samples with the following results: 2.33 milligrams per liter (mg/l) for the Ward 5 sample where the total lead concentration was 1,170 mg/kg and 1.28 mg/l for the Ward 7 sample in which the total lead concentration was 1,380 mg/kg. Both of the TCLP results are below the regulatory level of 5 mg/l.

4.3.3 Miscellaneous Areas of Concern

Soil samples from the miscellaneous area samples (designated M-1 through M-12) were collected at areas of dumping and historical activities, such as coal storage, warranting investigation. The observed conditions that resulted in collection of these samples are provided in Table 4-6.

Organic Compounds

No VOCs or PCBs were detected in any sample at concentrations above SCGs.

SCGs for SVOCs were not exceeded in the samples from areas M-3, M-6, M-7 and M-8. Exceedances of SCGs for SVOCs were identified in the remaining eight miscellaneous areas of concern sampled (see Table 4-7 and Figure 4-3). The exceedances were similar for three of the areas (M-4, M-5 and M-10). In these samples, three or four SVOCs (benzo[a]anthracene,

Table 4-6

**FORMER CENTRAL ISLIP PSYCHIATRIC CENTER
TARGETED SITE ASSESSMENT
POTENTIAL CONCERNS
IN MISCELLANEOUS AREAS OF CONCERN SAMPLES**

Sample Designation	Location	Potential Concern
M-1	Along western property boundary to the north	Containers of automotive fluids (oil and coolant)
M-2	Along western property boundary	Pail of polyurethane and household garbage
M-3	Along western property boundary	Gasoline cans
M-4	Along western property boundary	Automotive oil cans
M-5	Along western roadway in southern portion of site	Unknown apparent subsurface drainage structures
M-6	Along western property boundary in southern portion of site	Oil tank
M-7	Near concrete pad suspected of staging coal	North end of concrete pad suspected of staging coal
M-8	Near concrete pad suspect of staging coal	South end of concrete pad suspected of staging coal
M-9	Southern property boundary	C&D debris and household garbage
M-10	South-central area of site	Abandoned automobile
M-11	South-central area of site	Rusted drum labeled Freon
M-12	Central area of site	General household and commercial debris

Table 4-7

CENTRAL ISLIP PSYCHIATRIC CENTER TARGETED SITE ASSESSMENT

SEMIVOLATILE ORGANIC COMPOUND CONCENTRATIONS EXCEEDING NYSDEC
RECOMMENDED SOIL CLEANUP OBJECTIVES IN MISCELLANEOUS AREA SAMPLES

SAMPLE ID	CIP-M-1	CIP-M-1	CIP-M-2	CIP-M-4	CIP-M-5	CIP-M-9	LABORATORY QUANTITATION LIMITS	NYSDEC Recommended Soil Cleanup Objectives
SAMPLE DEPTH	0-2 IN	18-24 IN	0-2 IN	0-2 IN	0-2 IN	0-2 IN		
DATE OF COLLECTION	6/30/2005	6/30/2005	6/30/2005	6/30/2005	6/30/2005	6/30/2005		
DILUTION FACTOR	1.0	1.0	1.0	1.0	1.0	10.0		
PERCENT SOLIDS	88.0	99.0	89.0	91.0	86.0	93.0		
UNITS	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	(ug/Kg)	(ug/Kg)
Benzo(a)anthracene	5,500 DJ	140 J	1,300	280 J	630	1,300	550	224 OR MDL
Chrysene	24,000 D	310 J	2,800	350 J	1,100	1,500	550	400
Benzo(b)fluoranthene	24,000 D	740	5,900 D	630	1,000	2,100	550	1,100
Benzo(k)fluoranthene	12,000 D	320 J	2,800	250 J	610	770	550	1,100
Benzo(a)pyrene	6,000 DJ	210 J	1,700	320 J	770	1,500	550	61 OR MDL
Indeno(1,2,3-cd)pyrene	4,100 DJ	200 J	970	160 J	250 J	440	550	3,200
Dibenzo(a,h)anthracene	1,100	80 J	440	54 J	98 J	180 J	550	14 OR MDL

SAMPLE ID	CIP-M-10	CIP-M-11	CIP-M-11	CIP-M-12	CIP-M-12		LABORATORY QUANTITATION LIMITS	NYSDEC Recommended Soil Cleanup Objectives
SAMPLE DEPTH	0-2 IN	0-2 IN	18-24 IN	0-2 IN	18-24 IN			
DATE OF COLLECTION	6/29/2005	6/29/2005	6/29/2005	7/8/2005	7/8/2005			
DILUTION FACTOR	1.0	5.0	1.0	10.0	1.0			
PERCENT SOLIDS	90.0	90.0	90.0	94.0	92.0			
UNITS	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg		(ug/Kg)	(ug/Kg)
Benzo(a)anthracene	280 J	9,600	340 J	14,000	9,400 D		550	224 OR MDL
Chrysene	400	12,000 D	320 J	16,000	12,000 D		550	400
Benzo(b)fluoranthene	360 J	10,000	270 J	24,000	6,100 DJ		550	1,100
Benzo(k)fluoranthene	150 J	6,500	180 J	9,400	2,800		550	1,100
Benzo(a)pyrene	270 J	11,000	280 J	21,000	7,800 D		550	61 OR MDL
Indeno(1,2,3-cd)pyrene	110 J	2,600	88 J	5,200	1,500		550	3,200
Dibenzo(a,h)anthracene	40 J	1,100 J	44 J	2,300 J	720		550	14 OR MDL

QUALIFIERS:

U: Compound analyzed for but not detected

J: Compound found at a concentration below the CRDL, value estimated

D: Result taken from reanalysis at dilution

U*: Result qualified as non-detect based on validation criteria

NOTES:

MDL: Method Detection Limit

 Indicates value exceeds NYSDEC Recommended Soil Clean-up Objective

4.4 Groundwater

4.4.1 Site Hydrogeology

The findings of the limited hydrogeologic investigation conducted at the site are provided below.

Lithology

The shallow native material at the site, as encountered in the test pits, was comprised of light brown and buff colored, medium to coarse-grained sand, and fine to medium-grained gravel.

The logs of the two subsurface soil conductivity probe holes (Appendix E) show the following:

- elevated soil conductivity values were up to approximately 85 milliSiemens per minute (mS/min) in both logs at approximately the 4 to 5-foot depth horizon; and
- slightly elevated soil conductivity values (up to approximately 20 mS/min) were detected between approximately 22 to 24 feet at location L-1, and between 15 to 24 feet at location L-2.

The conductivity survey identified no significant low permeability layers that could potentially significantly affect vertical migration of contamination between grade and 24 feet below. The shallow, thin, high-conductivity layer may represent a zone of fill or a thin layer with higher silt and clay content than the overlying and underlying horizons. Although the deeper, slightly elevated conductivity measurements indicate the presence of a siltier matrix in these areas, it does not appear continuous enough to significantly affect vertical contaminant migration.

Groundwater Depth and Flow

The water level data collected from the three site piezometers are provided in Table 4-9 including the piezometer measuring point elevations, depth to water measurements and the resultant water table elevations. The depth to groundwater measurements in the piezometers varied between approximately 16 and 28 feet below grade. The water levels declined approximately 1.5 feet between the July and September 2005 gauging events. Relative water levels in the piezometers for the two gauging events are consistent with each other and the associated water table elevation contour maps are similar. The water table elevation contour map for July 1, 2005 is shown on Figure 4-5. Data collected during this investigation show that the shallow groundwater flow direction at the site is toward the southeast and the headwaters of the Connetquot River, located approximately a mile east of the site (see site vicinity map in Figure 2-1). The flow direction determined during this investigation is consistent with data published by the SCDHS.

4.4.2 Field Parameter Measurements

The field parameter measurements collected during groundwater sampling are provided in Table 4-10. Variation in the results are summarized as follows:

- Specific conductivity was elevated in upgradient sampling point GW-2, with a measurement of 0.773 milliSeimens per centimeter (mS/cm) compared to the 0.170 mS/cm average for the other samples; and
- Dissolved oxygen was elevated in upgradient sample point GW-1, with a measurement of 10.53 mg/l compared to the 6.70 mg/l average for the other samples.

As shown on Figure 4-5, the groundwater sample designations are GW-1 and GW-2 for the upgradient sample points and GW-3 through GW-6 for the downgradient points. The analytical results are discussed by analyte group below.

Table 4-10

**FORMER CENTRAL ISLIP PSYCHIATRIC CENTER
TARGETED SITE ASSESSMENT
GROUNDWATER SAMPLING FIELD PARAMETER MEASUREMENTS**

Sample Designation	pH (SU)	Temperature (°C)	Specific Conductance (mS/cm)	Turbidity (NTUs)	Eh (mV)	Dissolved Oxygen (mg/l)
GW-1	6.56	16.41	0.209	799	331	10.53
GW-2	5.85	16.75	0.773	>999	130	5.59
GW-3	5.79	14.29	0.246	>999	234	7.80
GW-4	5.97	13.91	0.097	>999	85	6.69
GW-5	6.10	13.80	0.170	>999	223	6.16
GW-6	6.08	13.86	0.113	>999	-4	6.57

SU: Standard units

°C: Degrees Celsius

mS/cm: MilliSiemens per centimeter

NTU: Nephelometric turbidity units

mV: Millivolt

mg/l: Milligrams per liter

Organic Compounds

No VOCs, SVOCs or PCBs were detected in any of the six groundwater samples collected from the site.

Metals

Due to elevated turbidity measurements, all samples were analyzed for dissolved metals. The samples were filtered by the laboratory. Exceedances of SCGs for metals in groundwater are summarized in Table 4-11 and shown on Figure 4-6. As shown in this table, SCG exceedances were identified for eleven metals in groundwater, antimony, arsenic, beryllium, chromium, copper, lead, iron, manganese, nickel, silver and sodium. For each of these, except iron, the highest concentration was detected in upgradient samples GW-1 or GW-2. The elevated iron concentrations detected in all samples are typical for Long Island.

4.5 Data Usability Summary Report

Sixty-nine soil samples and six groundwater samples were collected during June and July 2005 as part of the field investigation at the Central Islip Psychiatric Center Targeted Site Assessment. The soil samples were analyzed for Target Compound List (TCL) SVOCs, Target Analyte List (TAL) metals and cyanide. Several of the soil samples were also analyzed for TCL VOCs and TCL PCBs. The groundwater samples were analyzed for TCL VOCs, TCL SVOCs, TCL PCBs, TAL metals and cyanide. The sample analyses were performed by Mitkem Corporation in accordance with NYSDEC Analytical Services Protocol (ASP) 6/00 methods.

The data packages submitted by Mitkem have been reviewed to determine whether the sample analyses were performed in accordance with the approved work plan and whether the analyses were compliant with the NYSDEC 6/00 ASP methods and Quality Assurance/Quality Control (QA/QC) requirements. The findings of the review process are summarized below.

4.6 Asbestos Survey

Ten samples were selected for asbestos analysis. These included four samples of conduit wrap and pipe insulation from manholes, and six samples of dumped materials that were comprised of roofing/shingle debris and asphalt roadway.

The details of the asbestos survey scope and findings are provided in the asbestos survey report from Testing Mechanics Corporation (Appendix I). Descriptions and photographic documentation of the survey, including the manholes investigated (interior features, contents and utilities and of samples collected) are included in the report. Descriptions of the samples collected, including materials sampled, sample locations and analytical results are summarized in Table 4-12. Of the ten samples analyzed for asbestos, four qualified as asbestos containing material (ACM). These materials included pipe insulation collected in the vicinity of Ward 6 and from Manholes 10 and 12, and roofing/shingle debris collected along the main roadway in the central portion of the site.

Sample analysis was performed in accordance with the NYSDEC 6/00 ASP methods and all QA/QC requirements (i.e., calibrations, tunes, area counts, etc.) were met.

All samples were analyzed within the specified holding times.

Methylene chloride, bis(2-ethylhexyl)phthalate and benzylaldehyde results for several samples have been qualified as nondetect due to laboratory contamination. That is, the method blanks associated with the samples also contained that particular compound and the concentration detected in the sample was less than five times that detected in the blank. As a result, applicable results have been reported as 'U*' on the data summary tables.

The semivolatile fraction for samples CIP-M-1 (0-2), CIP-M-2 (0-2), CIP-M-11 (0-2) and CIP-M-12 (18-24) required reanalysis at secondary dilutions due to concentrations of several compounds that exceeded the instrument calibration range. The results for the affected compounds from the diluted analysis were utilized and have been flagged 'D' on the data summary tables.

The semivolatile fraction of sample CIP-M-12 (0-2) was re-extracted and reanalyzed, due to internal standard area counts outside of required limits. Since similar results between the samples were obtained, the results from the initial extraction have been reported.

The original SVOC analysis from sample CIP-TP-RH contained low levels of all target compounds, as if it contained the spiking solution. The sample was re-extracted outside of holding time but the sample results appeared to be more consistent with site conditions. Therefore, the results from the re-extraction for sample CIP-TP-RH have been reported on the data summary tables and should be utilized for environmental assessment purposes.

No other problems were found with the data and all results are deemed usable for environmental assessment purposes as qualified above. Data validation forms are provided in Appendix H.

Table 4-9

**FORMER CENTRAL ISLIP PSYCHIATRIC CENTER
TARGETED SITE ASSESSMENT
WATER LEVEL DATA**

Piezometer Designation	Measuring Point Elevation (feet)*	July 1, 2005		September 27, 2005	
		Depth to Water (feet)	Relative Water Table Elevation (feet)*	Depth to Water (feet)	Relative Water Table Elevation (feet)*
PZ-1	56.76	25.29	31.37	27.37	29.39
PZ-2	49.78	20.38	29.48	22.28	28.83
PZ-3	55.51	15.30	30.21	16.68	27.50

*Relative to a common datum.

Table 4-8

CENTRAL ISLIP PSYCHIATRIC CENTER TARGETED SITE ASSESSMENT

METALS CONCENTRATIONS EXCEEDING NYSDEC
RECOMMENDED SOIL CLEANUP OBJECTIVES IN MISCELLANEOUS AREA SAMPLES

SAMPLE ID	CIP-M-1	CIP-M-1	CIP-M-2	CIP-M-2	CIP-M-3	CIP-M-3	CIP-M-4	CIP-M-4	INSTRUMENT DETECTION LIMITS	NYSDEC Recommended Soil Cleanup Objectives	Eastern United States Background Concentration
SAMPLE DEPTH	0-2 IN	18-24 IN	0-2 IN	18-24 IN	0-2 IN	18-24 IN	0-2 IN	18-24 IN			
DATE OF COLLECTION	6/30/2005	6/30/2005	6/30/2005	6/30/2005	6/30/2005	6/30/2005	6/30/2005	6/30/2005			
DILUTION FACTOR	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
PERCENT SOLIDS	88.0	99.0	89.0	97.0	87.0	97.0	91.0	92.0			
UNITS	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	ug/l	mg/Kg	mg/Kg
Arsenic	11	U	10.3	0.47 B	1.9	0.82 B	4.9	4.4	3	7.5 or SB	3-12
Beryllium	0.19 B	0.054 B	0.18 B	0.068 B	0.13 B	0.084 B	0.13 B	0.18 B	0.5	0.16 or SB	0-1.75
Copper	31	4	30.9	4.5	8.1	5.1	21.5	14.7	4	25 or SB	1-50
Iron	13,800	1,450	17,600	2,120	4,700	2,560	5,990	8,480	26	2,000 or SB	2,000-550,000
Mercury	0.11	U	0.22	U	U	U	0.12	0.066 B	0.1	0.1	0.001-0.2
Nickel	8.4	2.4 B	20.8	2.5 B	4.1 B	3.8 B	7.7	4.9 B	0.8	13 or SB	0.5-25
Zinc	34.8	5.6	58.5	5.7	24.2	8.9	79.6	16.4	7	20 or SB	9-50

SAMPLE ID	CIP-M-5	CIP-M-5	CIP-M-6	CIP-M-6	CIP-M-7	CIP-M-7	CIP-M-8	CIP-M-8	INSTRUMENT DETECTION LIMITS	NYSDEC Recommended Soil Cleanup Objectives	Eastern United States Background Concentration
SAMPLE DEPTH	0-2 IN	18-24 IN	0-2 IN	18-24 IN	0-2 IN	18-24 IN	0-2 IN	18-24 IN			
DATE OF COLLECTION	6/30/2005	6/30/2005	6/30/2005	6/30/2005	7/8/2005	7/8/2005	7/8/2005	7/8/2005			
DILUTION FACTOR	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
PERCENT SOLIDS	86.0	91.0	87.0	96.0	88.0	92.0	83.0	87.0			
UNITS	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	ug/l	mg/Kg	mg/Kg
Arsenic	3.9	2.1	7.7	2.2	3	1.6 B	37.9	9.6	3	7.5 or SB	3-12
Beryllium	0.14 B	0.15 B	0.26 B	0.16 B	0.25 B	0.27 B	0.56 B	0.082 B	0.5	0.16 or SB	0-1.75
Cobalt	0.75 B	0.85 B	2.5 B	0.97 B	1.1 B	1.4 B	38.9	0.7 B	0.9	30 or SB	2.5-60
Copper	13.2	8.1	31.9	5.7	17.2	13.5	64	12.8	4	25 or SB	1-50
Iron	6,420	7,460	14,800	7,580	11,300	5,600	31,600	18,000	26	2,000 or SB	2,000-550,000
Mercury	0.13	U	0.14	U	U	U	0.062 B	U	0.1	0.1	0.001-0.2
Nickel	4.5 B	4.5 B	9	4.8 B	4.8 B	6.1 B	45.7	7.2 B	0.8	13 or SB	0.5-25
Zinc	21.4	20.7	100	17.9	10.6	11.8	106	9.8	7	20 or SB	9-50

SAMPLE ID	CIP-M-09	CIP-M-09	CIP-M-10	CIP-M-10	CIP-M-11	CIP-M-11	CIP-M-12	CIP-M-12	INSTRUMENT DETECTION LIMITS	NYSDEC Recommended Soil Cleanup Objectives	Eastern United States Background Concentration
SAMPLE DEPTH	0-2 IN	18-24 IN	0-2 IN	18-24 IN	0-2 IN	18-24 IN	0-2 IN	18-24 IN			
DATE OF COLLECTION	6/30/2005	6/30/2005	6/29/2005	6/29/058	6/29/2005	6/29/2005	7/8/2005	7/8/2005			
DILUTION FACTOR	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
PERCENT SOLIDS	93.0	97.0	90.0	93.0	99.0	90.0	94.0	99.0			
UNITS	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	ug/l	mg/Kg	mg/Kg
Beryllium	0.13 B	0.12 B	0.18 B	0.17 B	0.12 B	0.19 B	0.17 B	0.14 B	0.5	0.16 or SB	0-1.75
Copper	9.3	5	13.8	7.3	12.8	10.4	26.1	8	4	25 or SB	1-50
Iron	3,750	6,830	8,490	8,070	5,450	7,470	11,200	5,160	26	2,000 or SB	2,000-550,000
Mercury	0.045 B	U	0.16	U	0.094	U	0.076 B	U	0.1	0.1	0.001-0.2
Zinc	23.6	8.6	118	17.4	58.3	21.1	186	30.4	7	20 or SB	9-50

QUALIFIERS:

U: Compound analyzed for but not detected

B: Compound concentration is less than the CRDL but greater than the IDL

NOTES:

SB: Site background

Indicates value exceeds the NYSDEC Recommended Soil Cleanup Objective

chrysene, benzo[a]pyrene and/or dibenzo[a,h]anthracene) were detected generally similar to, or within an order of magnitude of their SCGs. These areas were sampled primarily due to the presence of abandoned automobiles and automotive fluid containers.

In the remaining samples (M-1, M-2, M-9, M-11 and M-12), up to seven SVOCs, including the four noted above in the other samples, plus benzo(b)fluoranthene, benzo(k)fluoranthene and indeno(1,2,3-cd)pyrene, were generally present at concentrations above SCGs in the shallow (0 to 2-inch) samples. The concentrations of the SVOCs were higher than in the other samples and up to two orders of magnitude higher than SCGs. However, the SCG for total SVOCs of 500,000 ug/kg was not exceeded in any of these samples. The highest SVOC concentrations were associated with M-12, along the main north-south roadway near the dining hall, where miscellaneous household debris was present. In the 18 to 24-inch samples, SVOC concentrations generally decreased significantly and were generally below SCGs. The exception was at M-12, where the SVOC concentrations were only slightly lower in the deeper sample.

Metals

The metal exceedances in the miscellaneous areas are summarized in Table 4-8 and shown on Figure 4-4. Similar to the building perimeter sample results, iron was ubiquitous in the miscellaneous area samples, and generally was detected at concentrations within the same order of magnitude as the SCG. Exceedances of SCGs for beryllium, mercury, nickel and zinc exceedances were sporadically detected, and either just above or similar to SCGs in most samples.

In addition, concentrations of arsenic and/or copper were detected above SCGs at five locations (M-1, M-2, M-6, M-8, and M-12). Except for M-8, the detected arsenic concentrations in these samples were near or within an order of magnitude above the SCG for arsenic of 7.5 mg/kg, and ranged from 7.7 mg/kg to 11.0 mg/kg. The arsenic concentration in M-8 was 37.9 mg/kg. Similarly, the concentrations of copper ranged from 26.1 mg/kg to 64 mg/kg, generally only slightly above the SCG of 25 mg/kg. Generally, the arsenic and copper exceedances do not appear significant.

Table 4-12

**FORMER CENTRAL ISLIP PSYCHIATRIC CENTER
TARGETED SITE ASSESSMENT
SUMMARY OF ASBESTOS SURVEY FINDINGS**

Sample Location	Sampled Material	Analytical Finding
Manhole 9	Wire wrap	Not ACM
Road in northwest area of site	Asphalt roadway	Not ACM
Manhole 11	Cable conduit sleeve	Not ACM
Area of Ward 6	Unearthed pipe insulation	ACM
Along center of main road near Dining Hall	Roofing Debris	Not ACM
Manhole 10	Pipe insulation	ACM
Manhole 12	Pipe insulation	ACM
Along center of main road near Manhole 16	Roofing debris	Not ACM
Along center of main road near Dining Hall	Shingle debris	ACM
Along center of main road near Dining Hall	Roofing debris	Not ACM

ACM: Asbestos Containing Material

Table 4-11

CENTRAL ISLIP PSYCHIATRIC CENTER TARGETED SITE ASSESSMENT

METALS CONCENTRATIONS EXCEEDING CLASS GA
GROUNDWATER STANDARDS OR GUIDANCE VALUES

SAMPLE IDENTIFICATION	GW-1	GW-2	GW-3	GW-4	GW-5	GW-6	Instrument	NYSDEC Class GA
DATE OF COLLECTION	07/06/05	07/07/05	07/07/05	07/07/05	07/07/05	07/07/05	Detection Limits	Standard or
DILUTION FACTOR	1.0	1.0	1.0	1.0	1.0	1.0		Guidance Value
UNITS	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Antimony	3.1 B	5.7 B	U	2.3 B	U	U	2.0	3 ST
Arsenic	18.1	25.8	12.2	8 B	2.1 B	5.4 B	2.0	25 ST
Beryllium	5.1	6.2	1.9 B	2.1 B	0.6 B	0.89 B	0.2	3 GV
Chromium	153	157	171	106	64.7	90.2	0.4	50 ST
Copper	136	220	114	66.7	25.3	46.5	2.0	200 ST
Iron	78,500	112,000	126,000	37,700	13,600	22,900	4.0	300 ST *
Lead	62.3	77.5	43.6	32.9	7.5	9.7	0.6	25 ST
Manganese	6,750	6,750	2,300	3,740	1,040	2,620	2.0	300 ST *
Nickel	113	125.0	71.6	44.9	44.2	44.2	0.3	100 ST
Silver	32.6	52.70	2.80 B	17.90	U	5.70 B	0.3	50 ST
Sodium	10,000	180,000	22,100	5,190	4,170 B	15,400	46	20,000 ST

QUALIFIERS:

U: Compound analyzed for but not detected

B: Compound concentration is less than the CRDL but greater than the IDL

NOTES:

ST: Standard

GV:Guidance Value

*: Standard for the sum of Iron and Manganese is 500 ug/l

 Indicates value exceeds NYSDEC Class GA standard or guidance value.

Section 5

5.0 HUMAN HEALTH EXPOSURE ASSESSMENT

The purpose of this section is to qualitatively evaluate the potential risks to human health associated with the chemical contamination identified at the former Central Islip Psychiatric Center Site. Risks are evaluated based on the site's environmental setting and information on the nature and extent of contamination that was presented in previous sections of this report. The relevant environmental information is discussed in the context of current and potential human contact with contaminants of concern at potential locations where human exposure could occur without any remedial measures undertaken to mitigate contact with contaminants.

As with any risk assessment, this assessment is not intended to predict disease outcome. The purpose of this exposure assessment is to determine how and when an individual might be exposed to contaminants of potential concern associated with the site. A contaminant of potential concern (COPC) is any chemical detected in a medium that could produce adverse health effects under the right conditions of dose and exposure. For exposure to occur, there must be a complete "pathway of exposure" where a person can come into contact with COPCs. For a pathway to be complete, there must be: 1) a source or medium containing the COPC; 2) a location where human contact could take place i.e., an exposure point); and 3) a feasible means for the COPC to enter the person's body. The person who could come in contact with the COPC at an exposure point is called a "receptor." Routes of exposure considered in this and other human health exposures are ingestion (by mouth), dermal (contact with skin) and inhalation (breathing). Consistent with the New York State Department of Health (NYSDOH) and other regulatory agencies, this assessment considers both current and potential future exposures.

Consistent with the presentation of the environmental data in Section 4.0, the exposure assessment is presented by medium of interest (surface and subsurface soil, and groundwater). Note that the asbestos survey was conducted for site redevelopment considerations. As a result, asbestos is not addressed in this exposure assessment.

5.1 Soil

Surface Soil

Thirty two surface soil samples were collected across the site from former building areas and miscellaneous areas of concern. Sample locations are shown on Figure 3-1.

None of the surface samples contained VOCs or PCBs at concentrations exceeding SCGs. Most (25) of the surface soil samples contained one or more PAHs at concentrations exceeding SCGs. Metals were detected at concentrations above SCGs in all 32 surface soil samples.

Trespassers and future construction workers could be exposed to the impacted surface soil through ingestion, dermal contact and inhalation. In addition, the identified contamination may represent a potential exposure to off-site receptors (inhalation route) through dust released during construction activities.

Shallow Subsurface Soil

Thirty two shallow subsurface samples were collected from a depth of 18 to 24 inches below grade at the same locations as the surface soil samples. In addition, five composite subsurface soil samples were collected from test pits excavated within the former building foundations.

None of the subsurface samples contained VOCs or PCBs at concentrations exceeding SCGs. Twenty of the 37 subsurface soil samples contained PAHs at concentrations exceeding SCGs. Metals were detected at concentrations above SCGs in 17 subsurface soil samples.

Future construction workers could be exposed to the impacted subsurface soil through ingestion, dermal contact and inhalation. In addition, the identified contamination may represent

a potential exposure to off-site receptors (inhalation route) through dust released during construction activities.

5.2 Groundwater

No VOCs, SVOCs or PCBs were detected in the six shallow groundwater samples collected from the site. Although eleven metals exceeded SCGs in the groundwater, the highest concentration of each metal was detected in one of the upgradient samples along the northern and western site boundaries. Ingestion of the groundwater would be a complete exposure pathway if groundwater were used as a potable source downgradient of the site. No public water supply wells are located in the downgradient direction between the site and the nearest surface water discharge area, the Connetquot River.

5.3 Conclusions

There are current and potential future complete pathways for human exposure associated with the contamination at the former Central Islip Psychiatric Center Site. These exposure pathways are summarized as follow:

Current

- Trespassers onto Property
 - Ingestion, dermal contact and inhalation exposure to SVOCs and metals in the surface soil.

Future

- On-site Construction Worker
 - Ingestion, dermal contact and inhalation exposure to SVOCs and metals in the surface and subsurface soil.
- Off-site Receptors
 - Inhalation exposure to SVOCs and metals released from impacted surface and subsurface as fugitive dust during construction activities.

Section 6

6.0 FINDINGS AND CONCLUSIONS

This section presents the findings and conclusions of the Targeted Site Assessment conducted at the former Central Islip Psychiatric Center Site, based on the results of the field investigation and human health exposure assessment.

Building Characteristics

- The basements floors of the former buildings (six patient wards, the dining hall and inferred staff residence) were either concrete or earthen. The basements extended approximately 5 feet below grade.
- As part of demolition of the buildings, each basement was apparently filled with the building debris.

Soil Quality

- Former Building Foundations
 - SVOC contamination was detected at varying concentrations at each of the former building locations. Generally, concentrations were more significant in the dining hall, Wards 6 and 7, and Wards 8 and 9, and were only slightly elevated in the inferred staff residence building, and Wards 5 and 6. The contamination detected likely reflects either the nature of the C&D material or regional (possibly airborne) deposition, rather than illegal dumping, as the former building areas are somewhat remotely located on the property and show little evidence of dumping.
 - Metal contamination exists primarily in the C&D fill material at the ward building locations.
- Perimeter of Former Buildings
 - Significant SVOC contamination was detected within an approximately 25-foot area around the perimeter of the dining hall, inferred staff residence building, and Wards 4 and 5, and is primarily limited to the surface soil.
 - Metal concentrations were only slightly elevated around all former buildings and are generally limited to surface soil.

- **Miscellaneous Areas of Concern**

- Significant SVOC contamination was detected in 6 of the 12 miscellaneous areas of concern that were sampled. This contamination is generally limited to surface soil. The materials dumped in these areas vary, and include such items as automobile fluid containers, household garbage, appliances, tires, C&D debris, drums and abandoned automobiles.
- Metal concentrations were only slightly elevated at approximately half of these miscellaneous areas and are generally limited to the surface soil.

Hydrogeology

- Groundwater was encountered at depths of between approximately 15 and 25 feet below grade, and flows toward the southeast.
- Significant, low permeability soil horizons were not identified at the site between grade and the water table.

Groundwater Quality

- Metals were the only constituents of concern detected in groundwater at concentrations exceeding SCGs. The concentrations detected were higher in upgradient samples indicating that the concentrations detected either represent background conditions or an upgradient source for the elevated metals.

Human Health Exposure Assessment

- Currently, a complete exposure pathway exists for an on-site trespasser through direct contact, ingestion and inhalation for the SVOC and metals contamination detected in surface soil.
- In the future, a potentially complete exposure pathway could exist for the SVOC and metal contamination in surface and subsurface soil associated with direct contact, ingestion or inhalation scenarios by on-site construction workers, as well as for ingestion and inhalation (dust) by off-site receptors.

Section 7

7.0 RECOMMENDATIONS

Based on the analytical results, human health exposure assessment and conclusions presented in the previous sections of this report, we offer the following recommendations:

- Site access controls should be implemented to minimize the potential for trespassers to be exposed to the SVOC and metal contamination detected in surface soil at the site.
- Several of the manholes have compromised or missing covers and, as a result, pose a fall hazard to trespassers. These manholes should be repaired or removed.
- The soil significantly contaminated with lead identified within building foundations (dining hall, Wards 6 and 7, and Wards 8 and 9), and around the perimeters of former buildings (dining hall, inferred staff residence building and Wards 4 and 5) should be removed and properly disposed. This should be achieved primarily by excavating the existing building foundations and the surrounding debris.
- Illegally dumped material has contributed to surface soil contamination and, as a result, should be removed for proper disposal. Areas of significant dumping are located along the western site boundary, adjacent to the southwestern concrete pad and along the central north-south roadway. If the illegally dumped material is not properly removed, surface contact barriers and/or deed restrictions appropriate for reuse/redevelopment of the site may be necessary.
- The surface asbestos containing material identified in the areas of Ward 6 and the dining hall building should be removed by a licensed contractor.
- The identified asbestos containing material associated with the subsurface utilities in Manhole 10 and 12 should be addressed by a licensed contractor during redevelopment of the property.
- Future construction activities should be conducted with dust control measures and monitoring, consistent with Occupation Safety and Health Administration (OSHA) standards, for site workers and off-site potential receptors.
- Future construction activities should also involve the implementation of a Community Air Monitoring Program, consistent with New York State Department of Health (NYSDOH) procedures, to monitor the potential for off-site dust migration.
- The surface petroleum spill areas, identified in M1, M2, M-11 and M-12, need to be investigated to determine the extent of the contamination in the next work phase.

- Screening is recommended for surface soils in areas to be redeveloped for housing following the end of construction activities. Any soils exceeding SCGs should be replaced with clean soil, if necessary.